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Abstract :

This report presents the results of an extensive program of evaluation of fatigue and fracture properties of 8090 series of Al-Li alloys as candidate material for LCA airframe. This program was funded by ADA and included the setting up of the Automated Fatigue Testing Laboratory consisting of 5 computer controlled fatigue testing machines. DMRL also participated in the program. In particular fatigue crack growth resistance under constant amplitude LCA baseline design spectrum has been extensively investigated covering effect of various parameters such as rolling direction, temper, thickness etc. Results of low cycle fatigue tests, tensile tests and R-curve tests carried out largely at DMRL are also presented in this report. The report includes detailed description of the test facility setup and automated test procedure developed. The report also contains information obtained from literature on effect of various microstructural parameters of Al-Li-X alloys. The results presented in the report indicate that the damage tolerant grade Lital-C alloy in the 8090C-T81 condition is best suited for application to LCA airframe as skin material.